OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **MUD POND** the program coordinators recommend the following actions. *We would like to encourage the association to conduct more sampling events in the future. With a limited amount of data it is difficult to determine water quality trends. Since weather patterns and activity in the watershed can change throughout the summer it is a good idea to sample the lake several times over the course of the season, typically once a month is recommended.*

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show in-lake chlorophyll-a concentration is *fairly stable*, although there are no 2000 data for this parameter. We would like to see the chlorophyll concentration remain low next season. While algae are present in all lakes, an excess amount of any type is not welcomed. Algal concentrations can increase when there are external and internal sources of phosphorus. Phosphorus is the nutrient that algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.

- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The lower graph shows lake transparency is *improving*. Transparency was observed from a different sample location this season, which might be deeper than the previous sample location. The Secchi disk was visible on the bottom of the pond. The 2000 sampling season was considered to be wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake); the upper graph shows current year data. Phosphorus is the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time. These graphs show in-lake phosphorus levels are *fluctuating*. Phosphorus concentrations were lower this season, but the sampling location was different, and hopefully next season's results will more accurately represent phosphorus concentrations in the pond. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- *E. coli* originates in the intestines of warm-blooded animals (including humans) and is an indicator of associated and potentially harmful pathogens. Bacteria concentrations were below the state standard of 406 counts per 100 mL for Class B surface waters at the House by Bonnie's Brook (Table 12). The results were higher than desired, but we know that residents were working to resolve the situation. If residents are concerned about septic system impacts, testing when the water table is high or after rains is best. Please consult the Other Monitoring Parameters section of the report for the current standards for *E. coli* in surface waters.

- Conductivity in Bonnie's Brook, as well as the rest of the watershed decreased this year from the high results of last season (Table 6). This is most likely as a result of the excess rains, which tend to remove pollutants from the surface waters. Conductivity increases often indicate the influence of human activities on surface waters. This decreasing trend is a positive sign. Septic system leachate, agricultural runoff, iron deposits, and road runoff can each influence conductivity readings.

NOTES

- Monitor's Note (6/7/00): Possible failed septic next to Bonnie's Brook. Rain night before and this morning.

- Biologist's Note (6/7/00): No dissolved oxygen/temperature profile done. 1 meter sample from rocks off Goldmine Inlet.

USEFUL RESOURCES

Freshwater Wetlands: A Guide to Common Indicator Plants of the Northeast. By Dennis Magee, Univ. of Massachusetts Press, 1981. (413) 545-0111, or www.umass.edu/umext/bookstore.html

Nonpoint Source Pollution and Stormwater Fact Sheet Package. Terrene Institute. (800) 726-5253, or www.terrene.org.

Phosphorus in Lakes, WD-BB-20, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

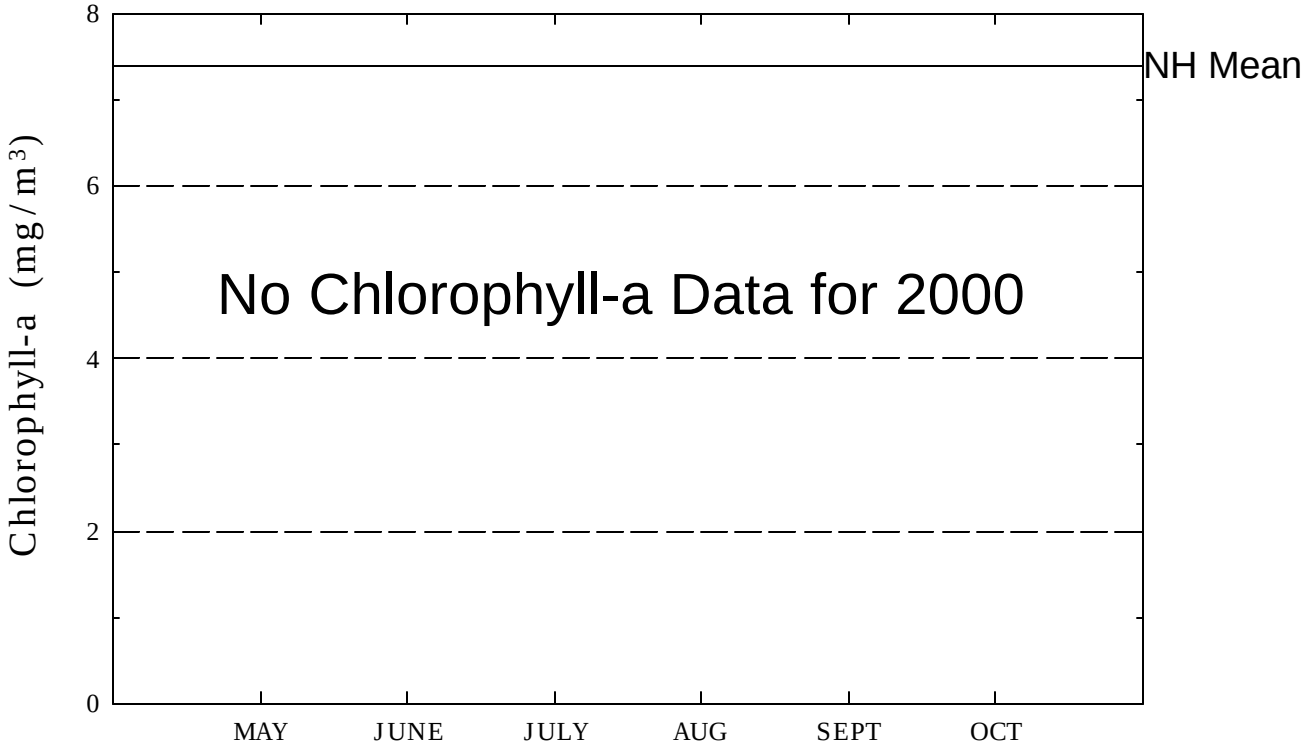
Septic Systems and Your Lake's Water Quality, *WD-BB-11*, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Water Sampling Protocol for E. coli Testing, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

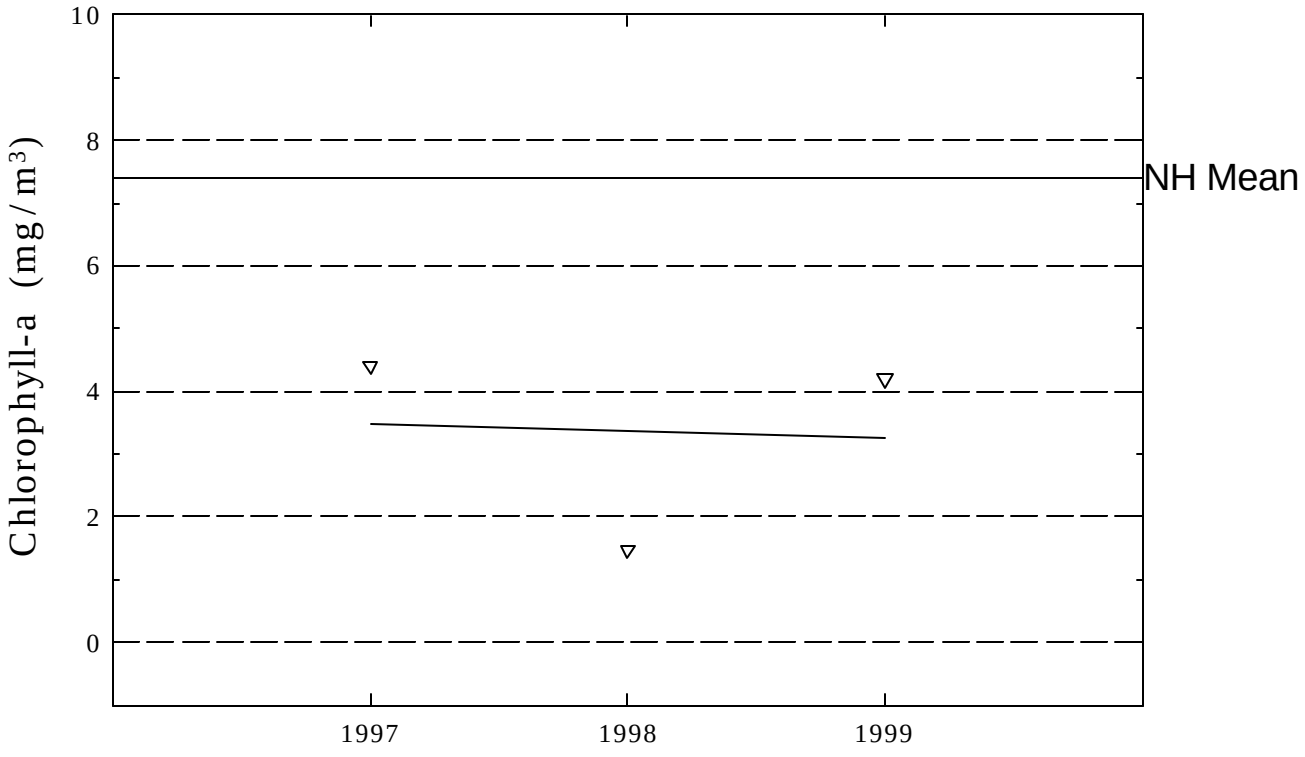
Beavers and Their Control. UNH Cooperative Extension/NH Fish and Game, 1990. (603) 862-2346, or ceinfo.unh.edu

Mud Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



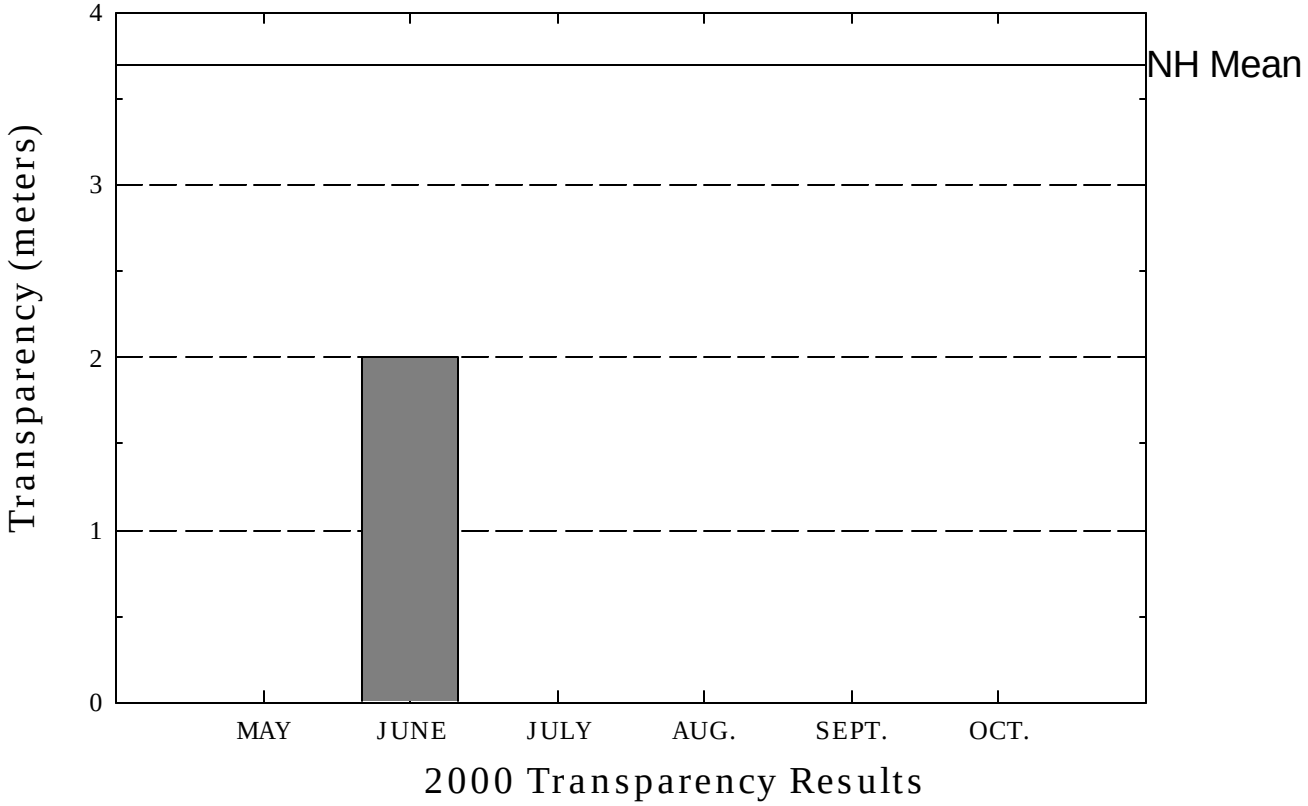
2000 Chlorophyll-a Results



Historical Chlorophyll-a Results

Mud Pond

Figure 2. Monthly and Historical Transparency Results



Mud Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

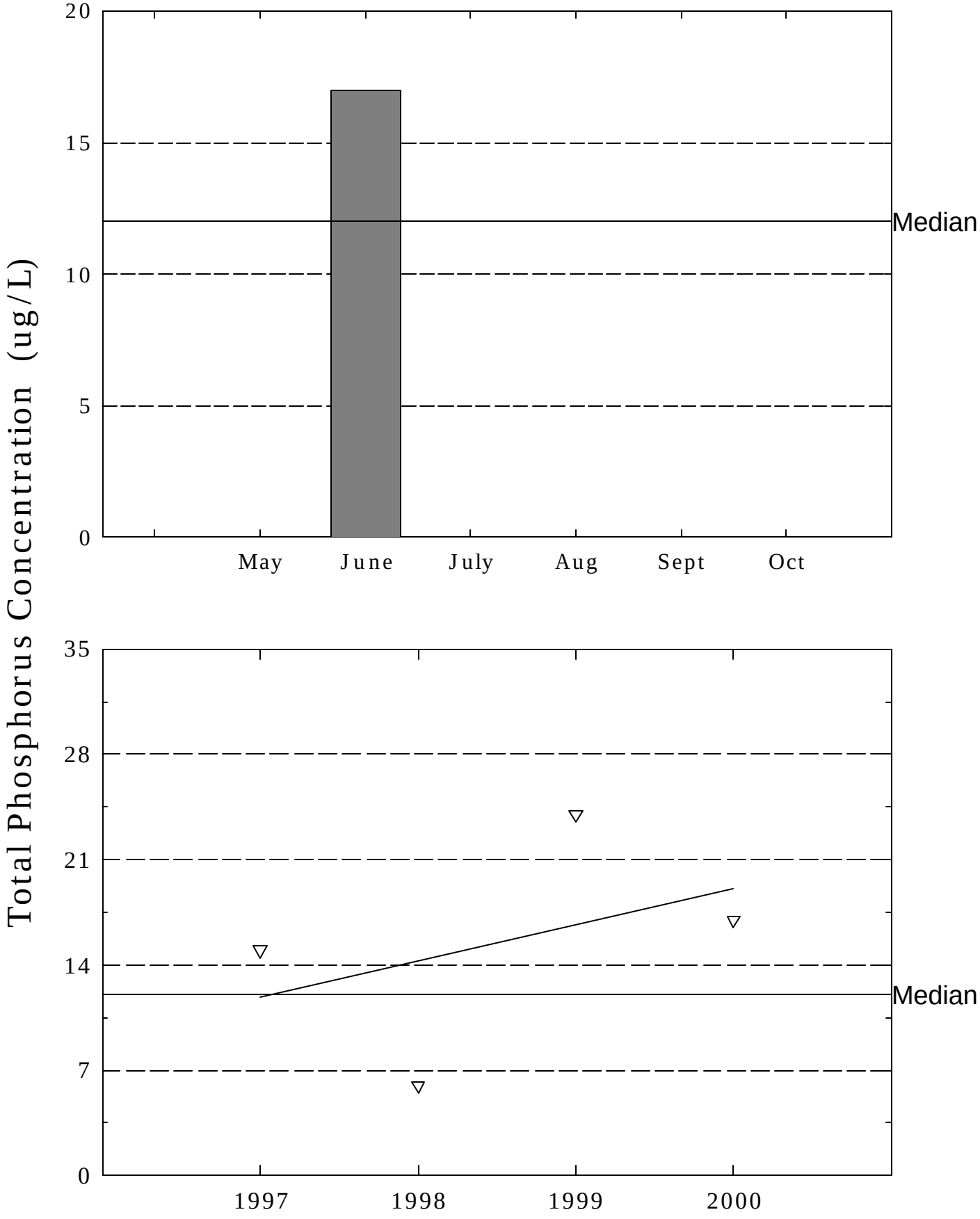


Table 1.

MUD POND

DUBLIN

Chlorophyll-a results (mg/m^3) for current year and historical sampling periods.

Year	Minimum	Maximum	Mean
1997	4.41	4.41	4.41
1998	1.47	1.47	1.47
1999	4.20	4.20	4.20

Table 2.

MUD POND

DUBLIN

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
06 / 05 / 1997	TABELLARIA	20
	MELOSIRA	16
	SYNEDRA	14
06 / 18 / 1998	TABELLARIA	49
	CHRYSOSPHAERELLA	41
	DESMIDIUM	3
06 / 17 / 1999	DINOBRYON	36
	TABELLARIA	14
	CHRYSOSPHAERELLA	7

Table 3.

MUD POND

DUBLIN

Summary of current and historical Secchi Disk transparency results (in meters).

Year	Minimum	Maximum	Mean
1997	1.3	1.3	1.3
1998	1.8	1.8	1.8
2000	2.0	2.0	2.0

Table 4.

MUD POND

DUBLIN

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
BONNIE'S BROOK				
	1997	6.91	6.91	6.91
	1998	6.28	6.28	6.28
	1999	6.58	6.58	6.58
	2000	6.35	6.35	6.35
CENTER BROOK				
	1997	6.35	6.35	6.35
	1998	5.66	5.66	5.66
	1999	6.04	6.04	6.04
	2000	6.18	6.18	6.18
EPILIMNION				
	1997	6.61	6.61	6.61
	1998	5.93	5.93	5.93
	1999	6.30	6.30	6.30
	2000	6.10	6.10	6.10
GOLDMINE INLET				
	1998	5.79	5.79	5.79
	1999	6.45	6.45	6.45
	2000	6.18	6.18	6.18
STANLEY BROOK				
	1997	6.55	6.55	6.55

Table 5.

MUD POND

DUBLIN

Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO .

Epilimnetic Values

Year	Minimum	Maximum	Mean
1997	5.50	5.50	5.50
1998	1.90	1.90	1.90
1999	9.60	9.60	9.60

Table 6.

MUD POND

DUBLIN

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
BONNIE'S BROOK				
	1997	96.9	96.9	96.9
	1998	59.5	59.5	59.5
	1999	105.5	105.5	105.5
	2000	65.5	65.5	65.5
CENTER BROOK				
	1997	35.4	35.4	35.4
	1998	26.0	26.0	26.0
	1999	41.3	41.3	41.3
	2000	31.4	31.4	31.4
EPILIMNION				
	1997	51.1	51.1	51.1
	1998	27.9	27.9	27.9
	1999	63.6	63.6	63.6
	2000	28.2	28.2	28.2
GOLDMINE INLET				
	1998	27.8	27.8	27.8
	1999	57.6	57.6	57.6
	2000	29.5	29.5	29.5
STANLEY BROOK				
	1997	35.6	35.6	35.6

Table 8.

MUD POND

DUBLIN

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
BONNIE'S BROOK				
	1997	8	8	8
	1998	5	35	20
	1999	15	15	15
	2000	16	16	16
CENTER BROOK				
	1997	27	56	41
	1998	12	12	12
	1999	37	37	37
	2000	21	21	21
EPILIMNION				
	1997	15	15	15
	1998	6	6	6
	1999	24	24	24
	2000	17	17	17
GOLDMINE INLET				
	1997	24	24	24
	1998	5	5	5
	1999	34	34	34
	2000	19	19	19
STANLEY BROOK				
	1997	12	12	12
	1998	20	20	20

Table 10.

MUD POND

DUBLIN

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
June 5, 1997	1.0	17.3	8.0	81.0
June 18, 1998	1.5	18.2	8.2	86.0

Table 11.

MUD POND

DUBLIN

Summary of current year and historic turbidity sampling.
Results in NTU's.

Station	Year	Minimum	Maximum	Mean
BONNIE'S BROOK				
	1997	0.5	0.5	0.5
	1998	0.7	0.7	0.7
	1999	1.4	1.4	1.4
	2000	1.2	1.2	1.2
CENTER BROOK				
	1997	1.4	1.4	1.4
	1998	0.5	0.5	0.5
	1999	2.3	2.3	2.3
	2000	0.7	0.7	0.7
EPILIMNION				
	1997	0.7	0.7	0.7
	1998	0.5	0.5	0.5
	1999	3.2	3.2	3.2
	2000	1.4	1.4	1.4
GOLDMINE INLET				
	1998	0.5	0.5	0.5
	1999	2.6	2.6	2.6
	2000	1.0	1.0	1.0
STANLEY BROOK				
	1997	0.7	0.7	0.7

Table 12.

MUD POND

DUBLIN

Summary of current year bacteria sampling.
Results in counts per 100ml.

Location	Date	E. Coli See Note Below
HOUSE BY BONNIE'S BROOK		
	June 7	138

NOTE: "<" means "less than" and ">" means "greater than"